

Richmond BF 0284(28) Bridge 32 on US Route 2 over Snipe Island Brook



**Presented by
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June 23, 2014

Meeting Outline

- Purpose of the Meeting
- Accelerated Bridge Program
- Existing bridge deficiencies
- Alternatives considered
- Summary and recommendation
- Next Steps

PROJECT LOCATION

Purpose of Meeting

- Present the alternatives that we have considered
- Explain the constraints to the project
- Help you understand our approach to the project
- Provide you with the chance to ask questions
- Provide you with the chance to voice concerns
- Build consensus for the recommended alternative-

Accelerated Bridge Program

- Began in January 2012
- Bridges are deteriorating faster than we can fix them
- Short-term closures are key
- Impacts to property owners and resources is minimized
- Less impacts = less process = less money = faster delivery
- Shift from individual projects to programmatic approach
- Goal of 25% of projects into Accelerated Bridge Program
- Goal of 2 year design phase for ABP (5 years conventional)

Phases of Development

Project
Funded

Project
Defined

Contract
Award

Project Definition

Project Design

Construction

Identify resources &
constraints

Evaluate alternatives

Public Participation

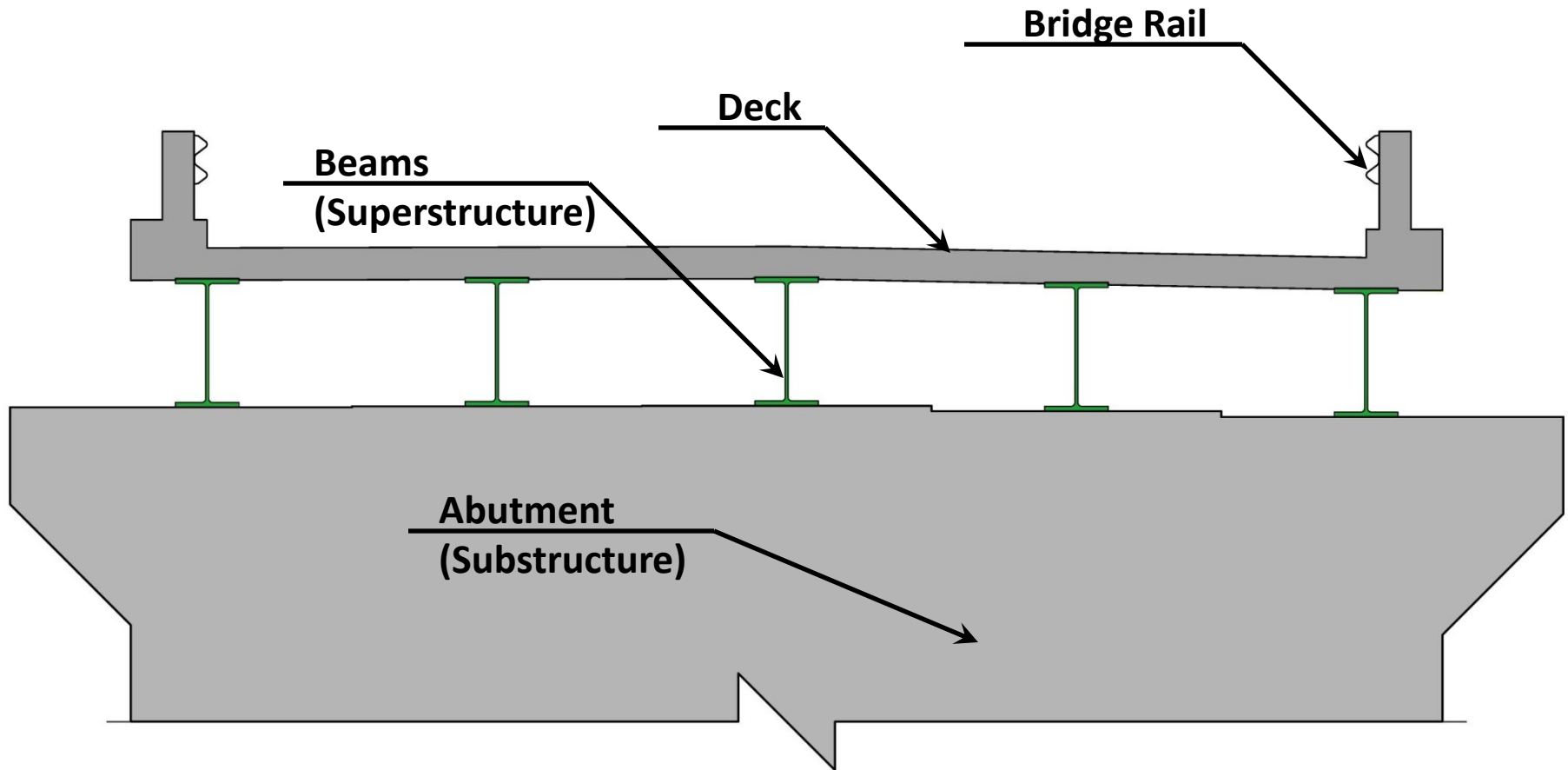
Build Consensus

- Quantify areas of impact

- Environmental permits

- Develop plans, estimate and specifications

Description of Terms Used



Cross Section of Bridge

Project Background

- The structure is owned and maintained by the State
- Funding will be 80/20 Federal/State (no local funds)
- Functionally labeled as a Rural Major Collector
- Posted Speed = 50 mph (Design Speed)
- Existing bridge is a single-span concrete T-beam
- Bridge length = 25 feet
- Bridge Width = 29 feet (11' lanes + 3' shoulders)
- The bridge was built in 1929 (85 years old)

Traffic Data

	“Current Year” 2016	“Design Year” 2036
Average Annual Daily Traffic	3,500	3,700
Design Hourly Volume	410	430
Average Daily Truck Traffic	310	510
%Trucks	1.8	2.8

EXISTING BRIDGE DEFICIENCIES

Inspection Rating Information (Based on a scale of 9)

Bridge Deck Rating	4 Poor
Superstructure Rating	5 Fair
Substructure Rating	5 Fair

Rating Definitions

9 Excellent
8 Very Good
7 Good
6 Satisfactory
5 Fair
4 Poor
3 Serious
2 Critical
1 Imminent Failure

Deficiencies

- The bridge is structurally deficient with a Poor deck rating and the remaining components only rated Fair.
- The shoulder width and banking is substandard
- The bridge does not meet the hydraulic standards and scour is evident

Looking east over Bridge



Looking west over Bridge





Looking Upstream



Looking Downstream



Underside of Bridge

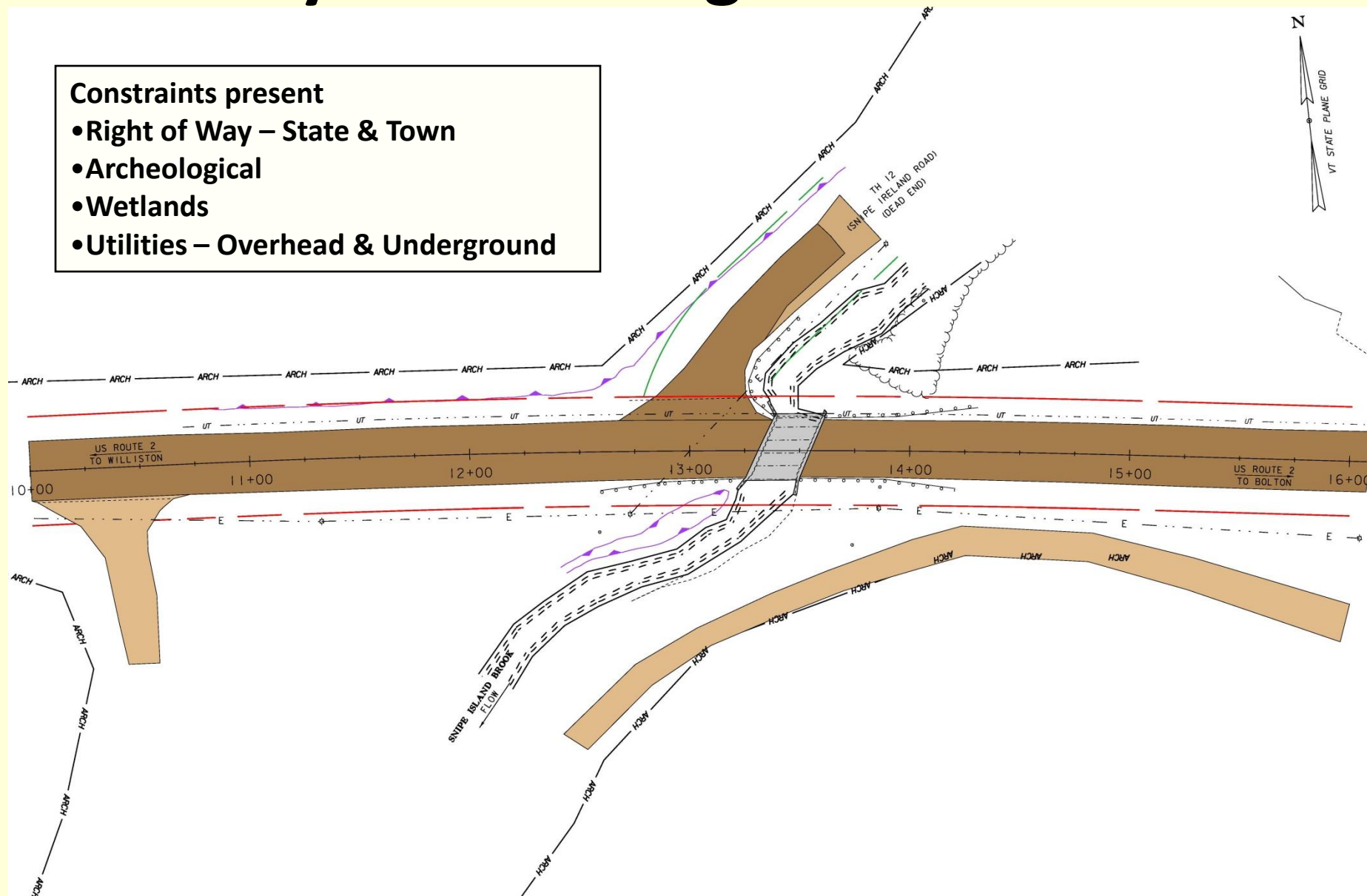


Crack in Abutment

Layout Showing Constraints

Constraints present

- Right of Way – State & Town
- Archeological
- Wetlands
- Utilities – Overhead & Underground



Alternatives Discussion

- Rehabilitation ruled out due to condition of bridge
- Full Bridge Replacement w/ 27' span rigid frame bridge
- Full Bridge Replacement w/ 50' span integral abutment bridge

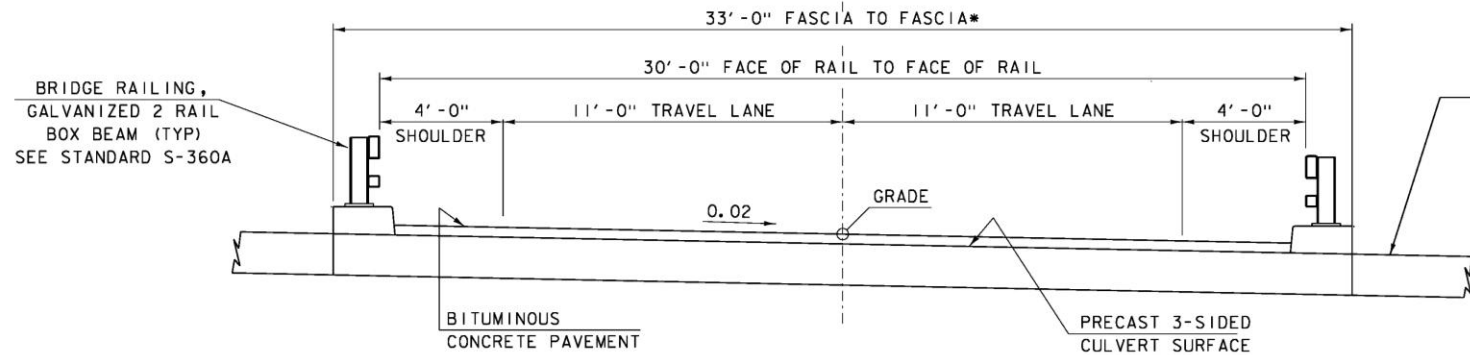
Note: The method to maintain traffic during construction will be considered separately later in the presentation

Alternative 1

Rigid Frame Details

- Complete bridge replacement
- Concrete Rigid Frame structure type
- 30' width between face of railing (4'-11'-11'-4')
- 27' bridge length with 20 degree skew
- Maintain existing centerline of road (improve banking)
- Raise grade of road to meet hydraulic standards
- Long-term (80 year) solution

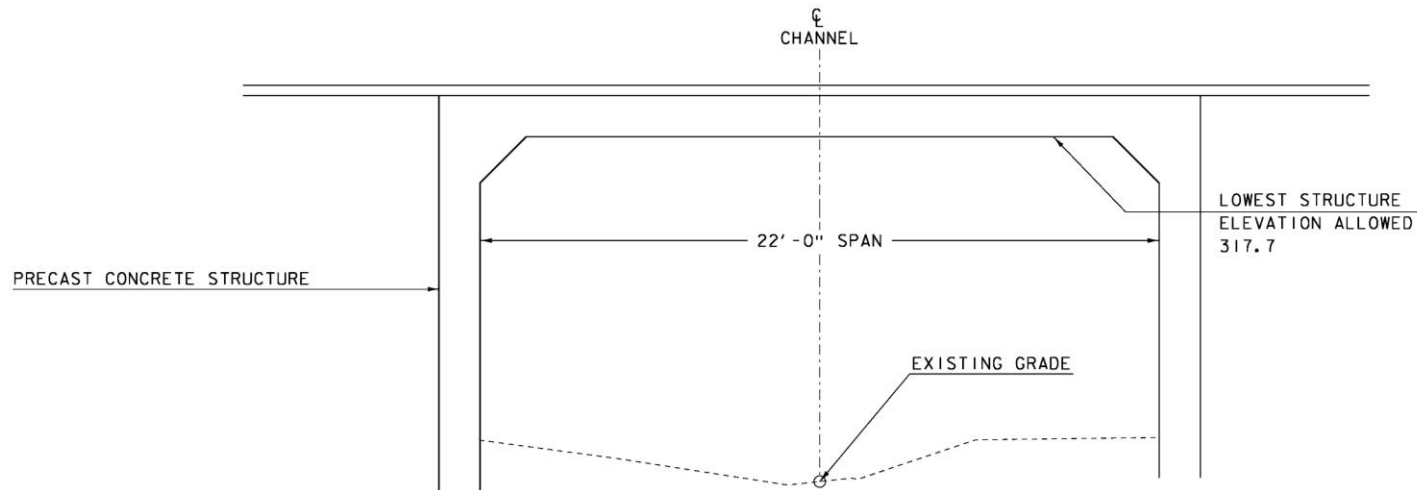
Typical Sections - Alternative 1



ALTERNATIVE 1 PROPOSED FRAME TYPICAL SECTION*

SCALE $\frac{3}{8}" = 1'-0"$

FLOW →



ALTERNATIVE 1 PRECAST 3-SIDED FRAME PROFILE

SCALE $\frac{3}{8}" = 1'-0"$

Rigid Frames



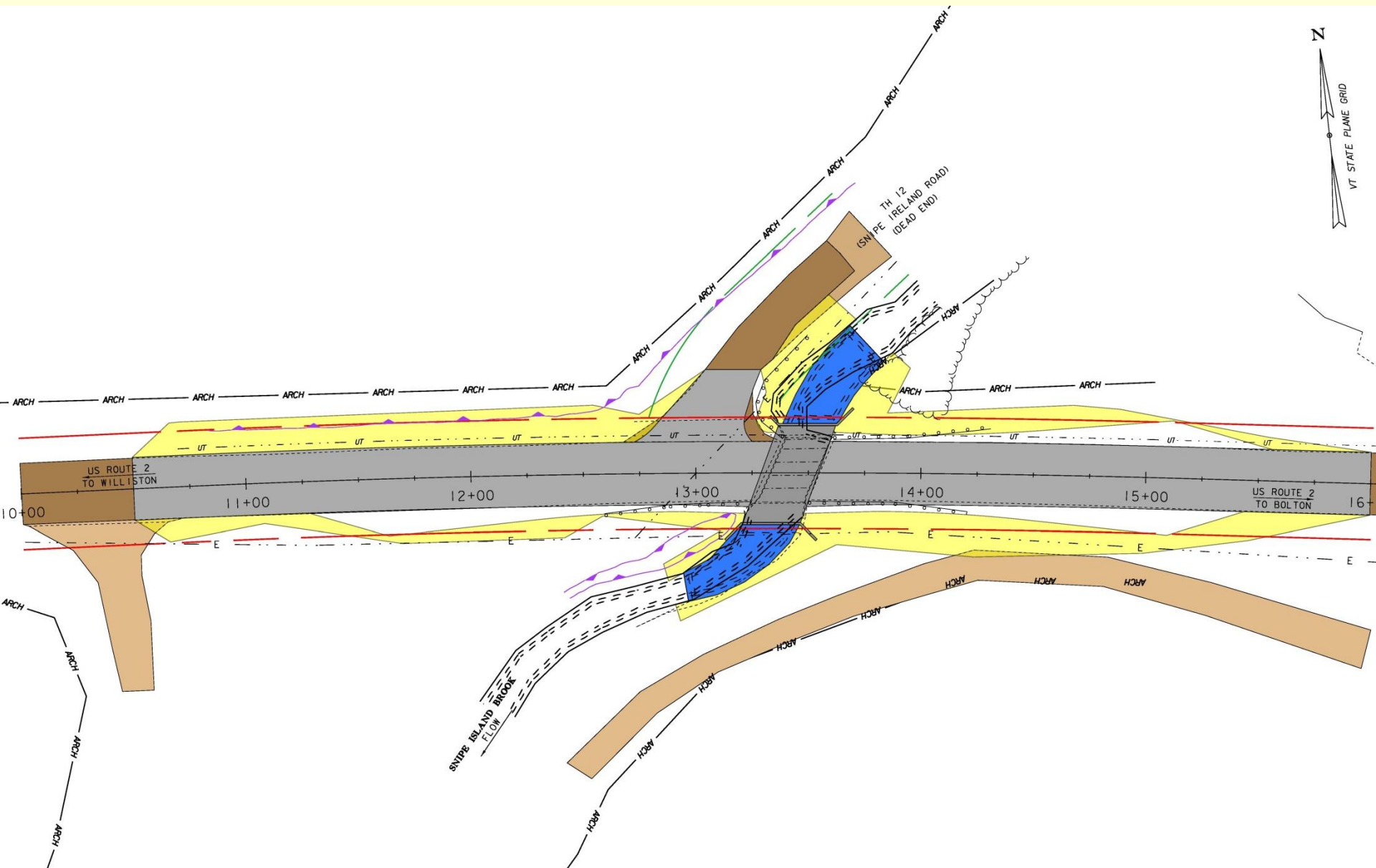
Segments lifted into place – Note dewatering pipe

Rigid Frames

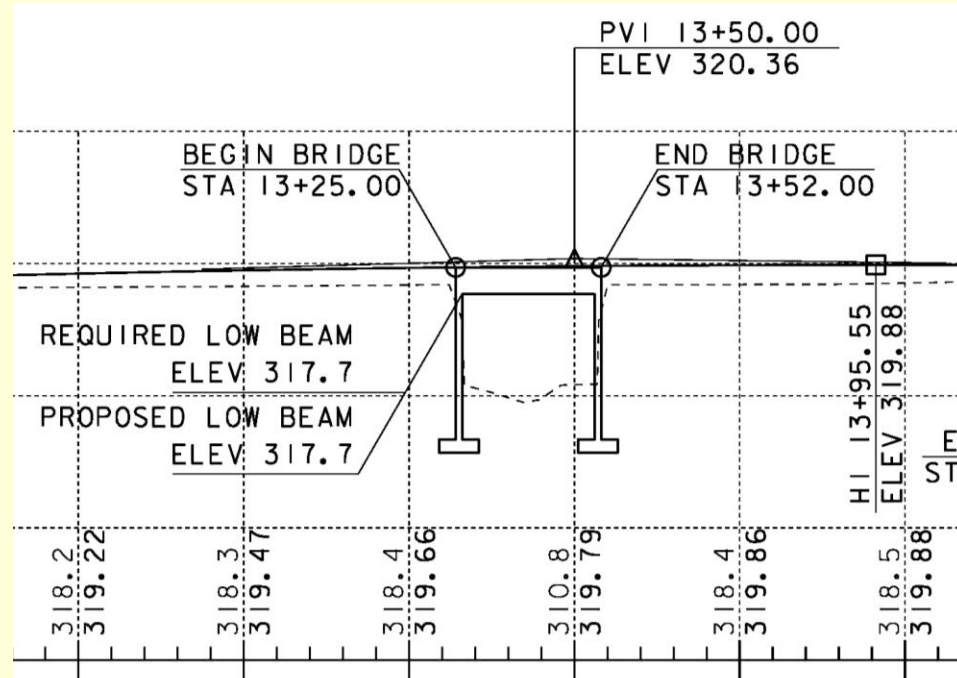
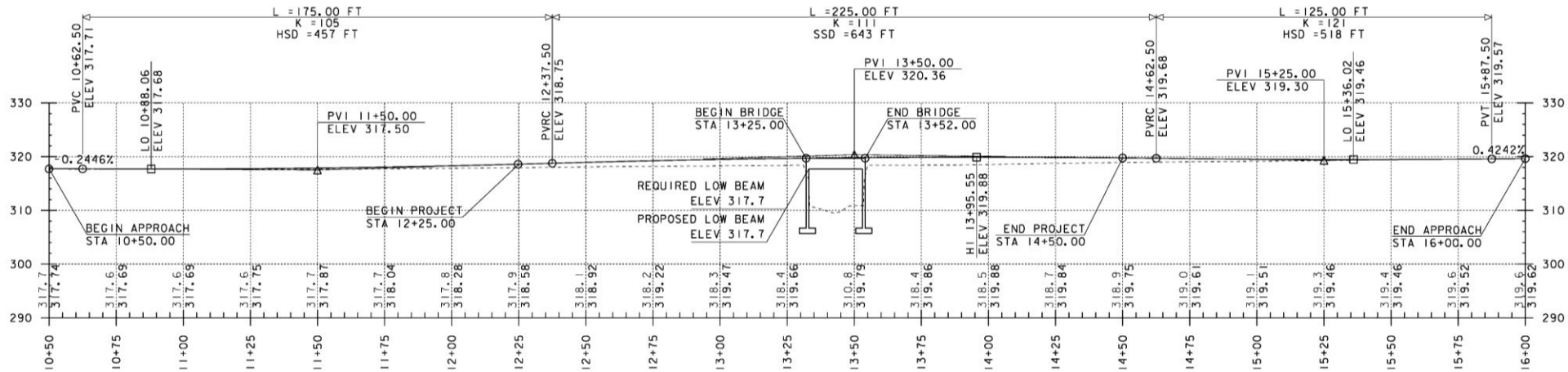


Side view of frame with guardrail attached

Layout – Alt 1 Rigid Frame



Profile - Alt 1



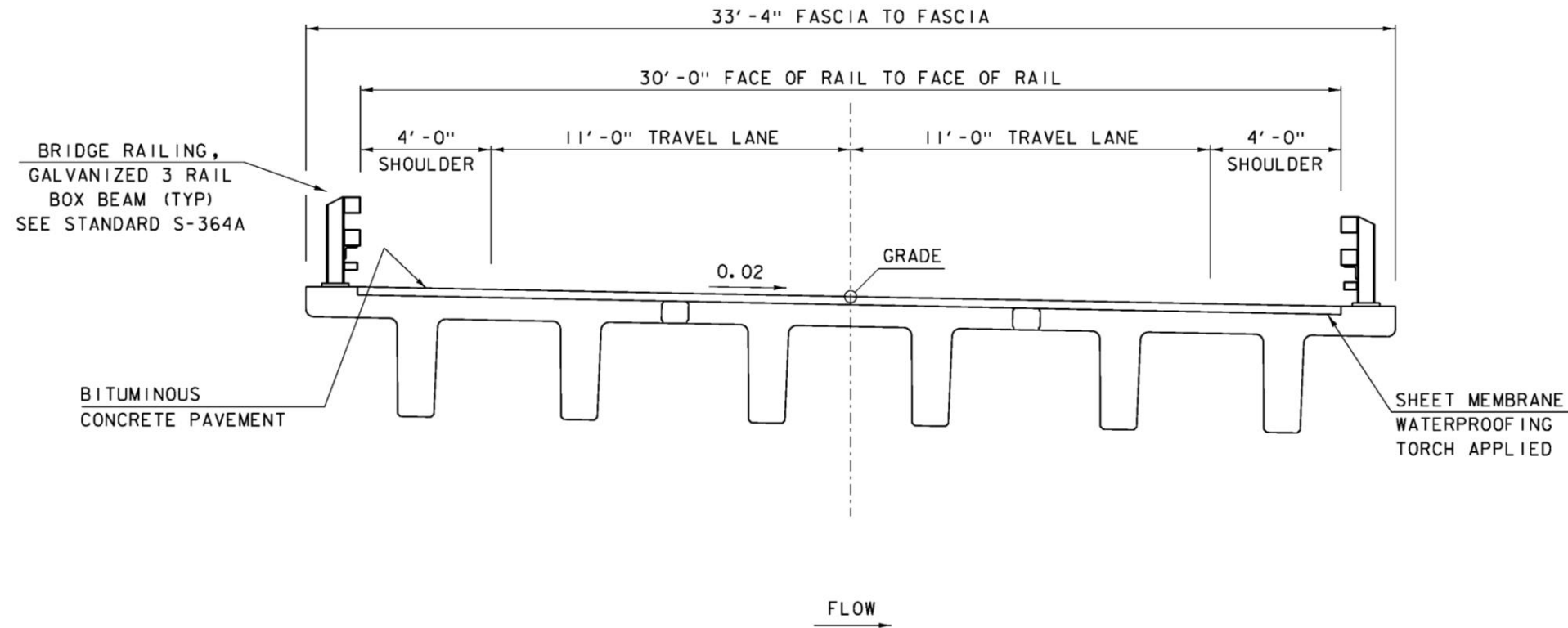
Enlarged view of bridge

Alternative 2

Integral Abutment Bridge Details

- Complete bridge replacement
- Integral Abutment structure type
- 30' width between face of railing (4'-11'-11'-4')
- 50' bridge span with 20 degree skew
- Maintain existing centerline of road (improve banking)
- Raise grade of road to meet hydraulic standards
- Realign intersection of Snipe Ireland road
- Long-term (80 year) solution

Typical Sections - Alternative 2



Integral Abutment Bridge



Driven steel piles with precast concrete cap for abutment

Integral Abutment Bridge



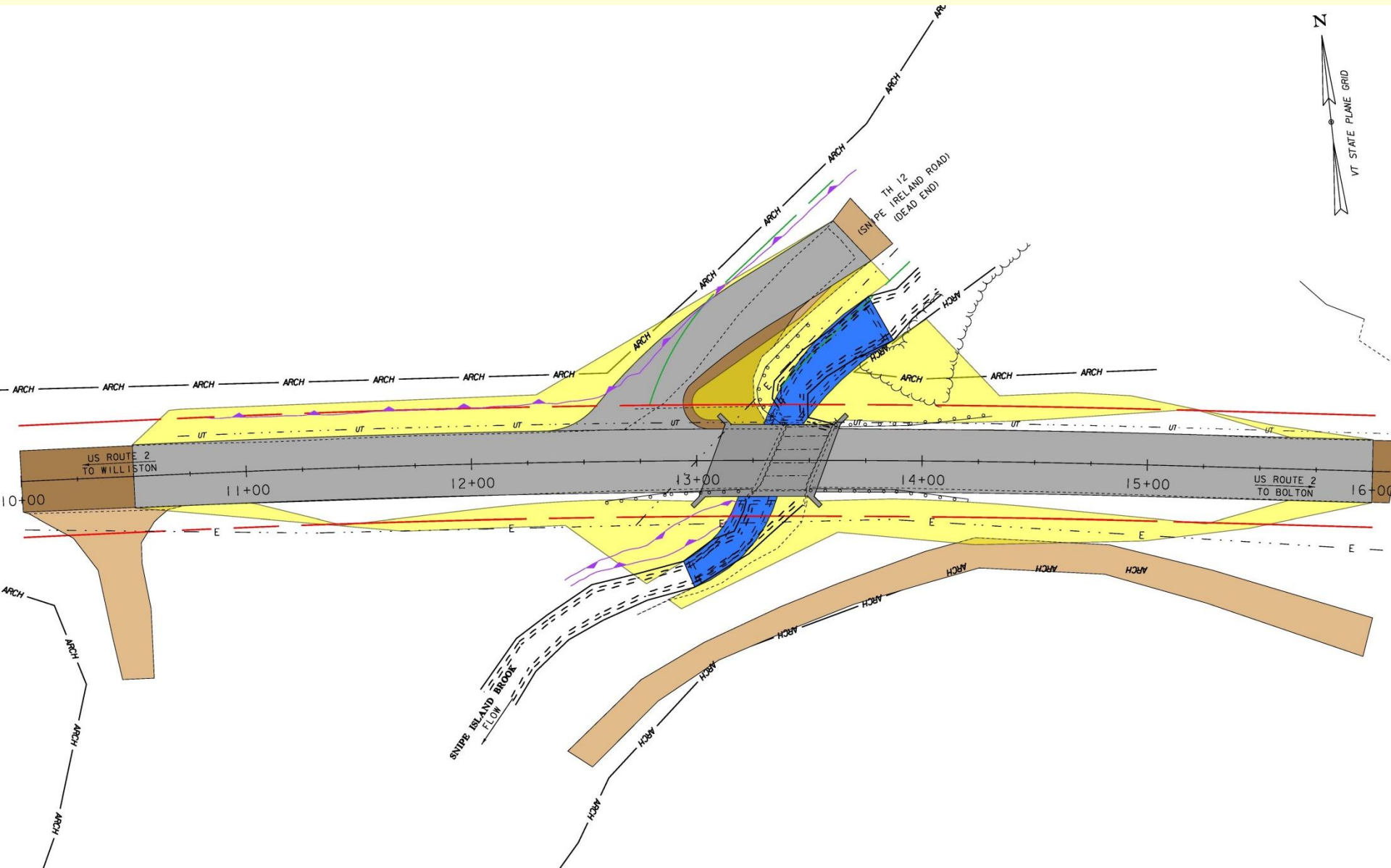
Precast concrete Abutment in place and ready for Superstructure

Integral Abutment Bridge

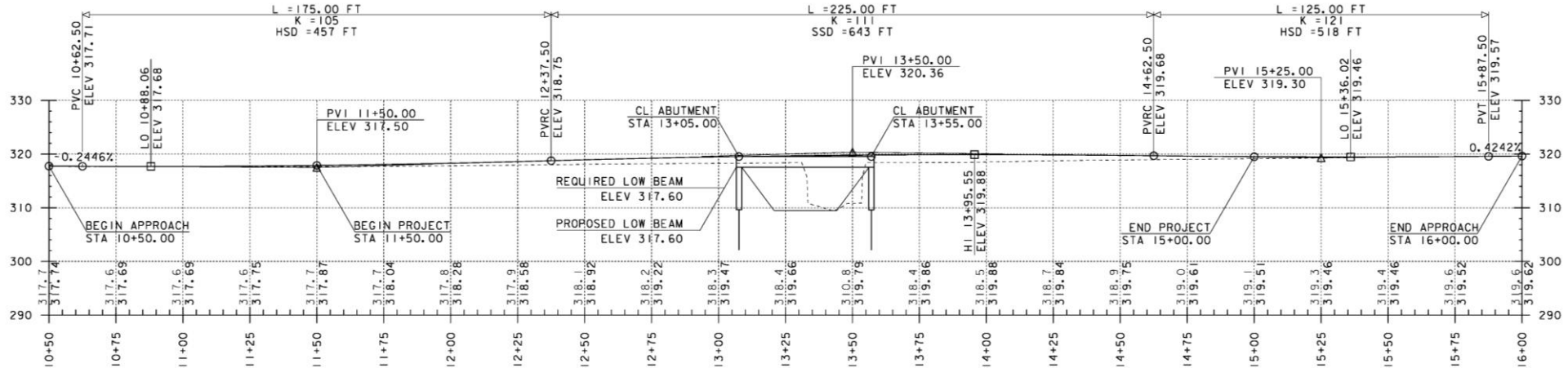


The second NEXT Beam being placed

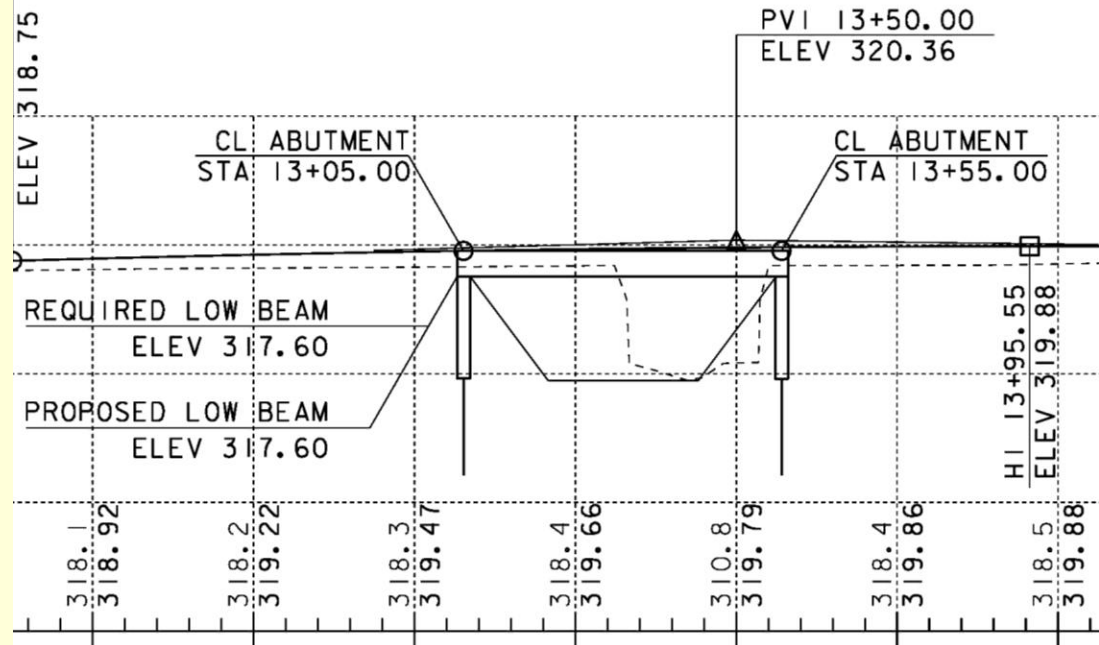
Layout – Alt 2 Integral Abutments



Profile - Alt 2



Enlarged view of bridge



Methods to Maintain Traffic

Three general methods available:

- Phased Construction
- Temporary Bridge
- Short-term bridge closure w/ off-site detour & ABC

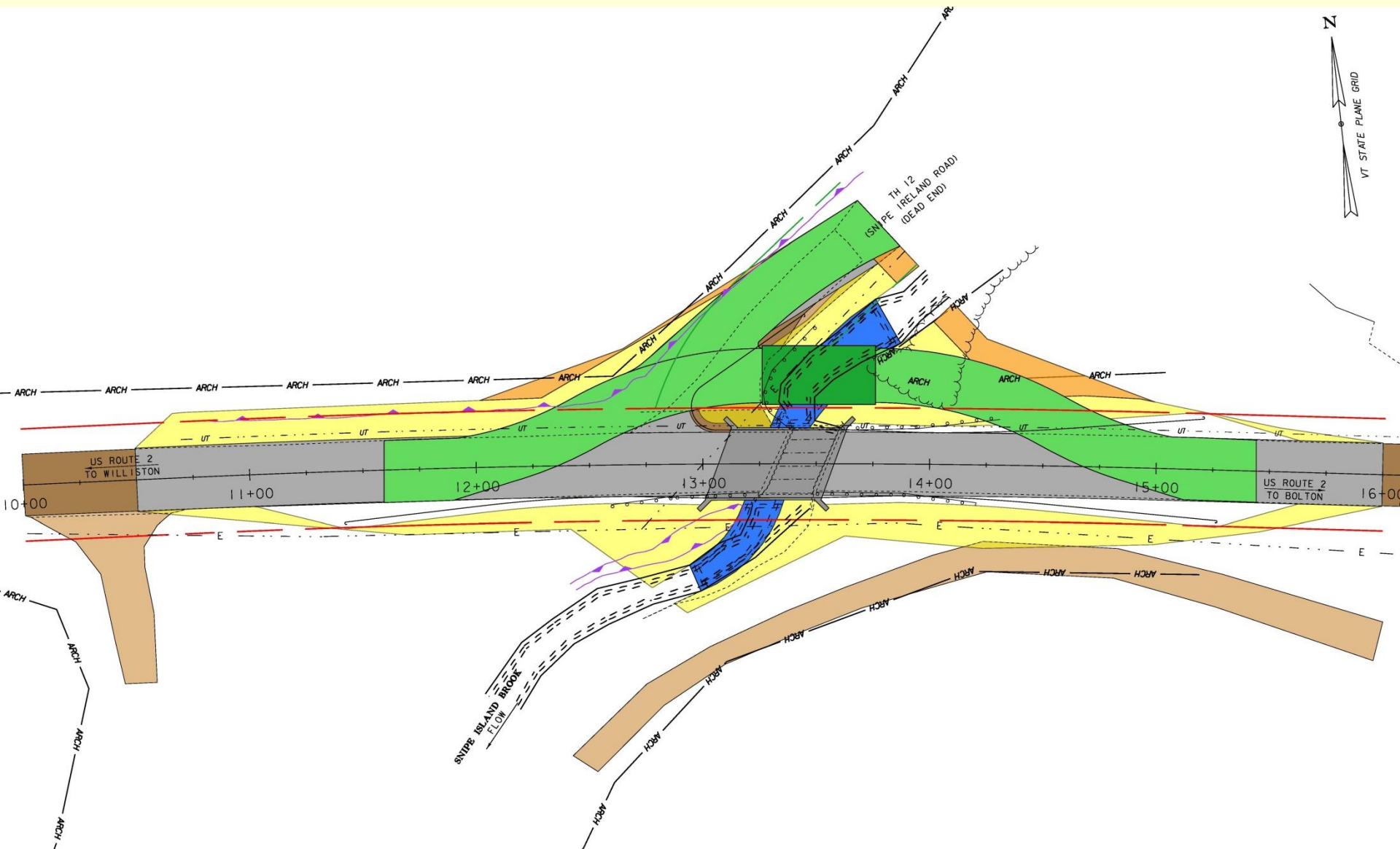
Phased Construction Option

- Ruled out due to unacceptable delays and traffic congestion caused by one lane of traffic and narrow existing bridge
- Build half new bridge while traffic is on half of old bridge
- Switch traffic on new bridge portion
- Build remainder of new bridge
- One-Way alternating traffic with lights
- Queue lengths and queue times can be inconvenient
- Access to side drives/buildings needs to be considered
- Relatively long construction duration
- Workers & motorists in close proximity – safety concerns
- Can sometimes be done without ROW acquisition

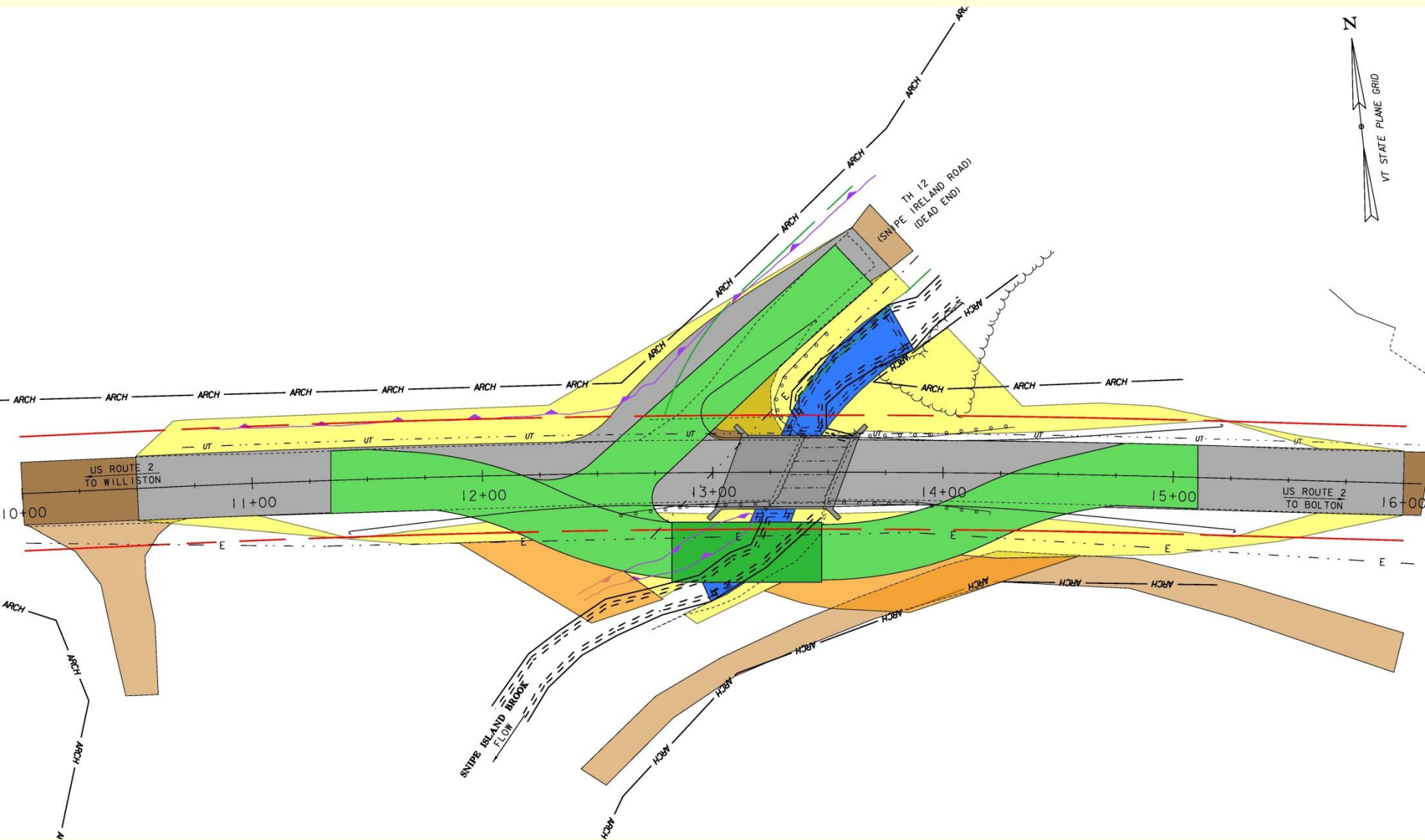
Temporary Bridge Option

- Construct temporary bridge to maintain traffic
- Two-Way bridge proposed due to traffic volumes
- Access to side drives/buildings needs to be considered
- Very long construction duration
- Right-Of-Way acquisition is necessary
- Environmental impacts are increased
- Conflict with underground utilities
- Property owner impacts are increased
- Project Delivery time increased
- Project Costs increased-

Layout - Temporary Bridge Upstream



Layout - Temporary Bridge Downstream



Accelerated Bridge Construction with Bridge Closure Option

- Bridge 32 to be closed for 4 weeks (for full replacement)
- Provide signed detour on State roads during closure period
- Allow 24/7 construction during bridge closure
- Contract incentives/dis-incentives to encourage contractor
- Contractor will receive more \$ if closure is less than stated in the contract
- Community would have input on time of closure (between June 1 and September 1)
- Public Outreach to provide advance notice for planning-

Detour Route on State Roads



A to B on Thru Route: 15.5 Miles
A to B on Detour Route: 15.5 Miles
Added Miles: 0.0 Miles
End to End Distance: 31.0 Miles

Major Factors

Added Miles: 0.0
End-End Miles: 31.0
Traffic Volume: 3,500 vpd
Duration: 4 weeks

Local Bypass Details

- A local bypass route is the most likely route to see an increase in traffic during the bridge closure other than the detour route
- No local routes would be appropriate for the detour route
- Local bypass route would not be considered the detour route
- State would not add signing on any local roads
- Route could be used for emergency response as appropriate
- We are in the process of developing a way to fairly and consistently compensate Town(s) for impacts due to increased traffic on **one defined** bypass route
- Compensation amount would mitigate for:
 - Providing police presence to deter speeding
 - Providing enforcement to enforce weight limits
 - Dust control
 - Roadway Maintenance

Local Bypass Route



A to B on Thru Route: 3.5 Miles
A to B on Bypass Route: 4.25 Miles
Added Miles: 0.75 Miles
End to End Distance: 7.75 Miles

Bridge St – Cochran Rd

**This route could be used by cyclists during a closure
or by emergency responders**

Concerned Stakeholders for Bridge Closures

A few groups we commonly hear concerns from:

- Businesses who lose drive-by traffic during the closure
- Schools who have a bus route over the closed bridge
- Motorists who have to travel a longer distance on the detour
- Emergency responders who have to respond quickly
- Owners living near the construction who are concerned with noise
- Owners living along a bypass route that will see increased traffic
- Municipalities who have increased impact to their local roads

Mitigation Strategies for Bridge Closures

Some ideas on how these impacts are often mitigated:

- Allow municipality input on time of year for closure
- Accelerated construction duration including:
 - Allowance for working 24 hours per day and 7 days per week
 - Incentive/Dis-incentive clause to encourage the contractor (\$\$)
- Noise limits included in contract for night time work
- Municipalities are compensated for bypass impacts
- Signing to notify motorists of business districts open for business
- Grant assistance from Agency of Commerce & Community Development (mainly for marketing ideas or public awareness)
- Many examples of creative solutions from people impacted-

Alternatives Matrix

	Alt 1a 27' Rigid Frame w/ Detour	Alt 1b 27' Rigid Frame w/ Temp Bridge	Alt 2a 50' Integral Abut w/ Detour	Alt 2b 50' Integral Abut w/ Temp Bridge
Construction w/ CE + Contingencies	\$1,082,000	\$1,244,000	\$1,295,000	\$1,456,000
Preliminary Engineering	\$251,000	\$289,000	\$301,000	\$339,000
Right of Way	\$63,000	\$96,000	\$75,000	\$113,000
Total Project Cost	\$1,396,000	\$1,629,000	\$1,671,000	\$1,908,000
Design Life	80 Years	80 Years	80 Years	80 Years
Project Development Duration	4 years	4 years	4 years	4 years
Construction Duration	6 months	18 months	6 months	18 months
Closure Duration	4 weeks	None	4 weeks	None

Conclusion and Recommendation

Bridge Type: Rigid Frame

- Less cost & future maintenance
- Less impacts
- Could possibly be constructed quicker

Maintenance of Traffic: Short-term closure

- Minimal impact to adjacent property owners
- Minimal impact to environmental resources
- Faster project delivery

Next Steps

This is a list of a few important activities expected in the near future and is not a complete list of activities.

- Meet to discuss comments from this public meeting
- Decide how to proceed and then document
- Develop Conceptual Plans
- Hold public meeting if needed based on alternative
- PROJECT DEFINED milestone
- Develop Preliminary Plans
- Environmental permitting
- Utility relocation

Questions



Direct any questions to:

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**This presentation is available at the
web address shown below**

<https://outside.vermont.gov/agency/vtrans/external/Projects/Structures/13C070>